
**Technical product documentation
(TPD) — General principles of
presentation —**

**Part 71:
Simplified representation for mechanical
engineering drawings**

*Documentation technique de produits (TPD) — Principes généraux de
représentation —*

Partie 71: Représentation simplifiée applicable aux dessins industriels



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TS 128-71 was prepared by Technical Committee ISO/TC 10, *Technical product documentation*, Subcommittee SC 6, *Mechanical engineering documentation*.

ISO/TS 128 consists of the following parts, under the general title *Technical product documentation (TPD) — General principles of presentation*:

- *Part 1: Introduction and index*
- *Part 20: Basic conventions for lines*
- *Part 21: Preparation of lines by CAD systems*
- *Part 22: Basic conventions and applications for leader lines and reference lines*
- *Part 23: Lines on construction drawings*
- *Part 24: Lines on mechanical engineering drawings*
- *Part 25: Lines on shipbuilding drawings*

- *Part 30: Basic conventions for views*
- *Part 34: Views on mechanical engineering drawings*
- *Part 40: Basic conventions for cuts and sections*
- *Part 44: Sections on mechanical engineering drawings*
- *Part 50: Basic conventions for representing areas on cuts and sections*
- *Part 71: Simplified representation for mechanical engineering drawings* [Technical Specification]

The presentation of shipbuilding drawings is to form the subject of a future part 15.

Introduction

This part of ISO 128 has been established to specify rules and guidance for the use of the simplified representation on mechanical engineering drawings.

It is not the purpose of the simplified representation to present difficulties in understanding the drawing. When its use could present such difficulties, it is intended that a complete representation in accordance with the basic rules of ISO 128 be used.

Technical product documentation (TPD) — General principles of presentation —

Part 71: Simplified representation for mechanical engineering drawings

1 Scope

This part of ISO 128 specifies general principles and basic methods for the application of the simplified representation on mechanical engineering drawings.

The provisions of this part of ISO 128 are based on those of ISO 128-20, ISO 128-30, ISO 128-40, ISO 128-50, ISO 129-1 (*Technical drawings — Indication of dimensions and tolerances — Part 1: General principles*) and ISO 6411 (*Technical drawings — Simplified representation of centre holes*).

NOTE For the simplified representation of individual products, such as fastenings, springs, seals, gear wheels, racks, worms, worm gear-wheels, splint joints and rolling bearings, see the relevant International Standards.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

complete representation

representation drawn in accordance with the valid rules of projection for technical drawings

3.2

simplified representation

representation drawn in accordance with the valid rules of projection and on which individual elements of the product are not shown, provided this does not present difficulties in understanding the drawing

3 General principles and basic methods of simplified representation

3.1 Principles

Simplified representation

- a) shall not lead to misunderstanding or equivocation,
- b) while making drawings easy to read and draw, should also emphasize the whole effect, and
- c) while facilitating manual and computer drawing, should also consider the requirements of microcopy drawing.

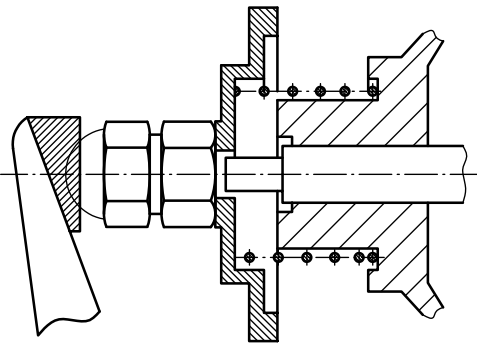
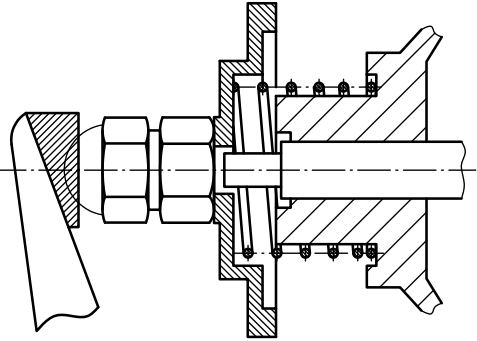
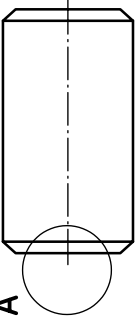
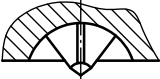
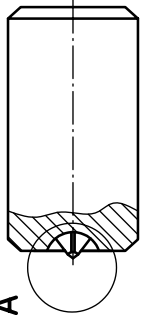

3.2 Basic methods

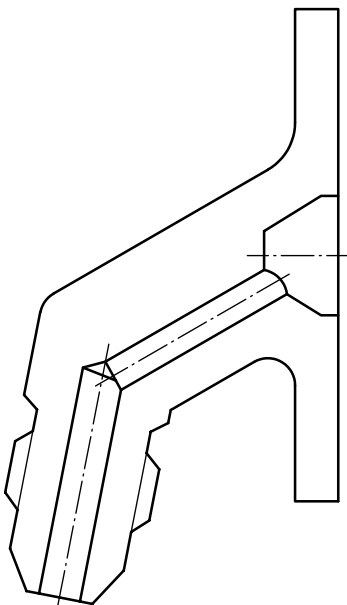
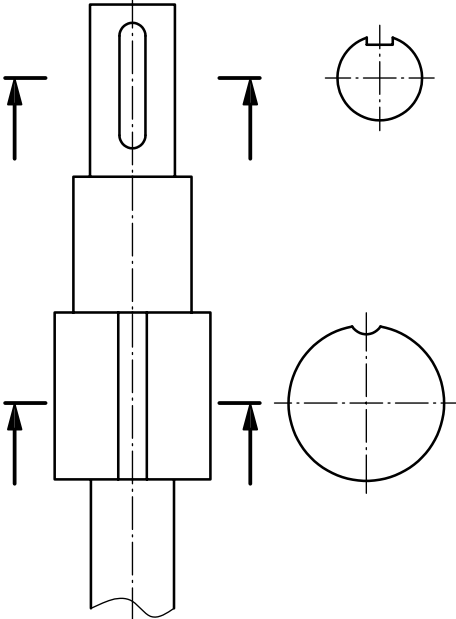
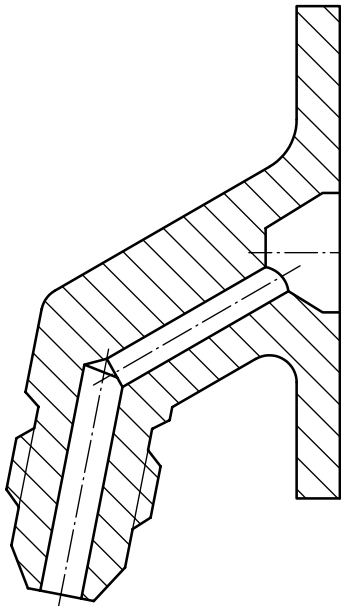
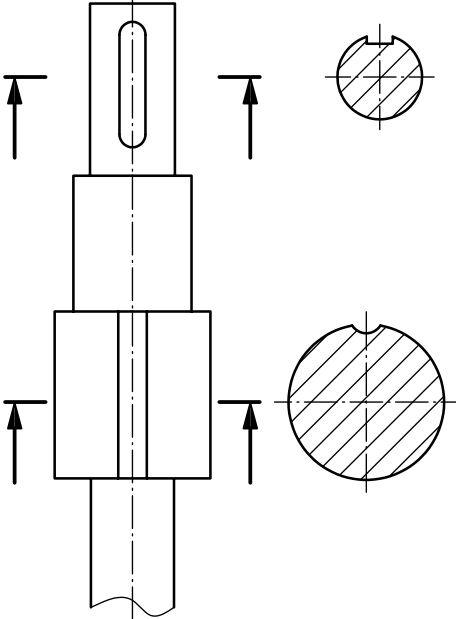
The basic methods for the use of simplified representation are

- a) **reducing** the repeat structure drawing for identical components (see examples 7 to 10),
- b) **omitting** the views, sections or cuts which are not necessary (see example 4), and
- c) **simplifying** the elements of drawing when the structure is clearly expressed (see examples 1 to 6 and 11 to 15).

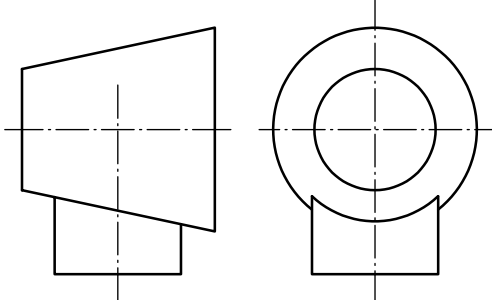
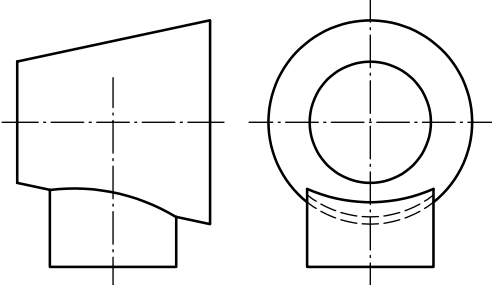
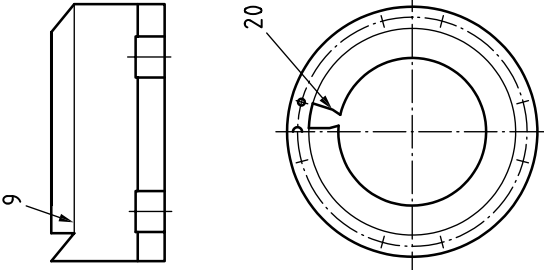
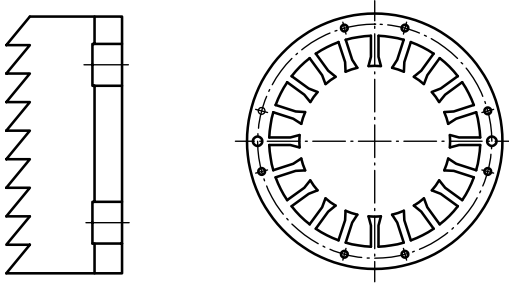
4 Examples

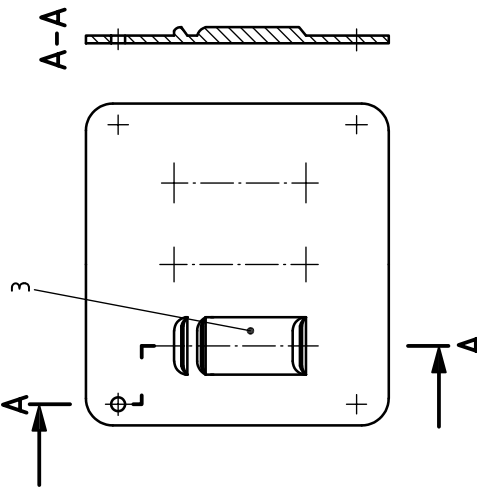
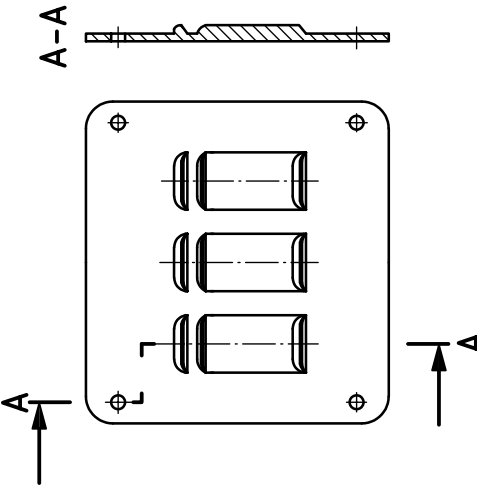
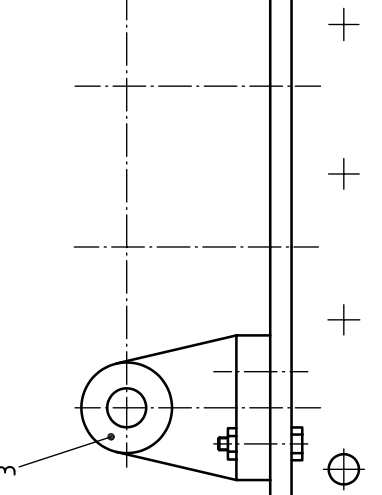
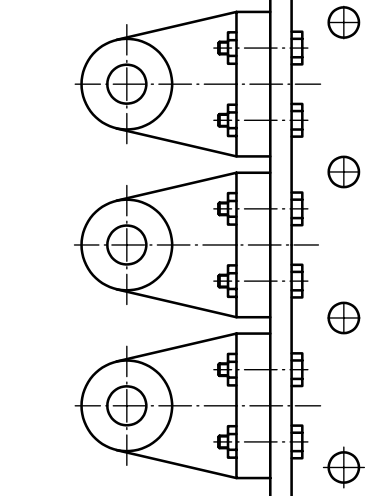
For comparison purposes, the following examples of the application of the principles and methods are given in both their simplified and conventional/complete representations.

Example No.	Simplified representation	Conventional representation	Description
1			Only the products or their features that are located in the sectional plane beyond the coiled spring need be shown.
2	 A (2:1) 	 A (2:1) 	It is permitted that the features shown on a detail section not be depicted on the principal view.

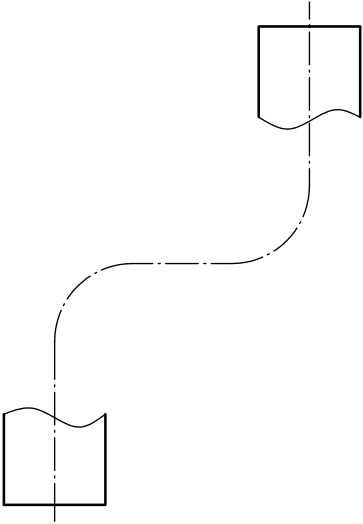
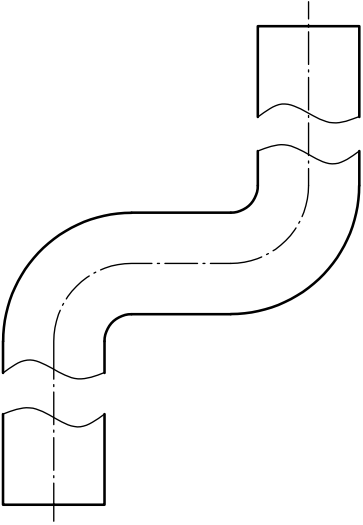
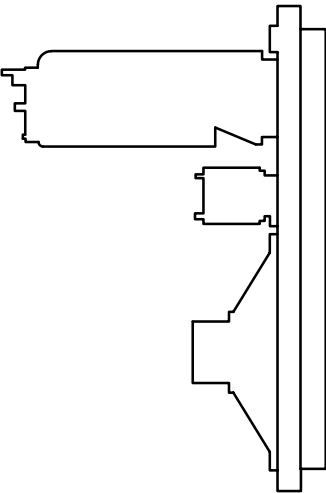
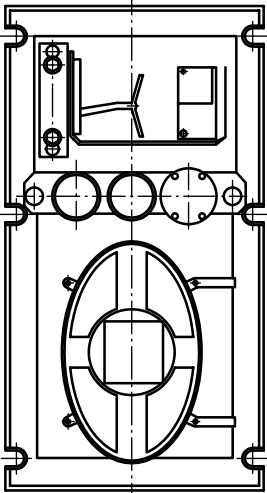
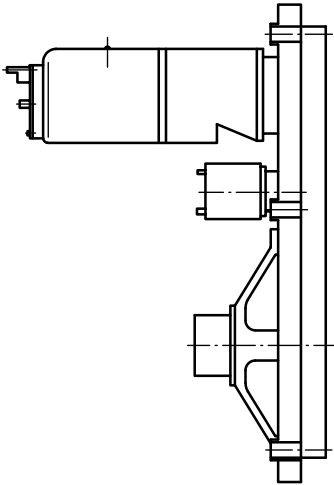
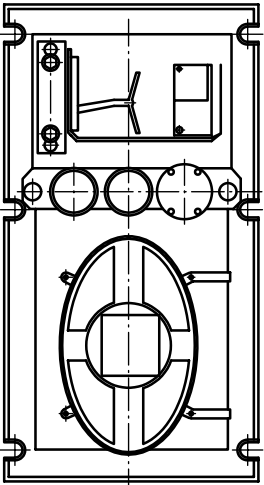
Example №.	Simplified representation	Conventional representation	Description
3	<div><p>A-A</p></div> <div></div>	<div><p>A-A</p></div> <div></div>	Simple sections are permitted not to be hatched.

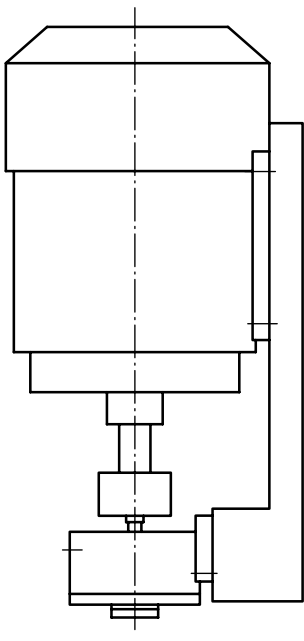
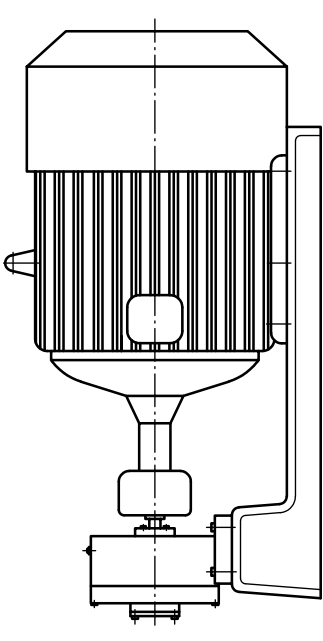
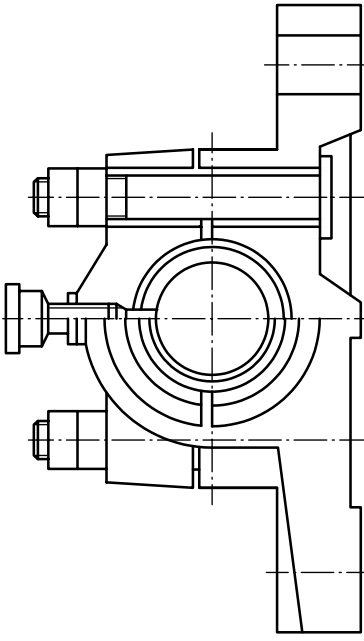
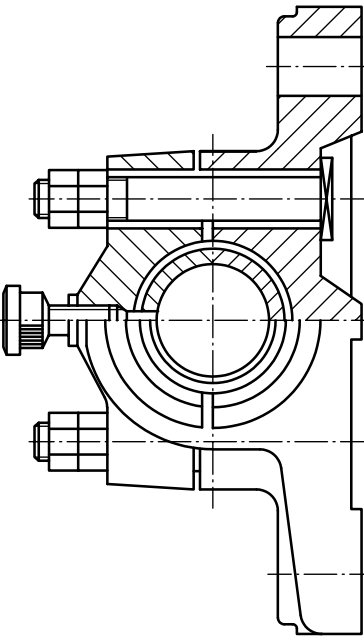
Example No.	Simplified representation	Conventional representation	Description
4			A local section is permitted to be made on the principal cut (section) view, provided the local section is identified.
5			Projections for circles or circular arcs whose angle of inclination with the projection plane is less than equal to 30° may be substituted by circles or circular arcs.

Example No.	Simplified representation	Conventional representation	Description
6			The easement curves of the bodies of revolution are permitted to be substituted by circumferences.
7			In a part where there is a certain number of identical, evenly spaced features (teeth, grooves, etc.), it is permitted to depict only one or two of these features on the simplified view, with the remainder being depicted using a narrow line and with their total number(s) indicated.

Example No.	Simplified representation	Conventional representation	Description
8			<p>Where there are groups of repeated features on the product, only one of the groups need be shown in full on the simplified view; the others may be depicted using centre lines, with their total number indicated.</p>
9			<p>Where the components (parts and assemblies) are located in a regular pattern on an assembly drawing, only one of the groups need be shown in the simplified view, while the arrangement of other components may be depicted using centre lines, with their total number indicated.</p>

Example No.	Simplified representation	Conventional representation	Description
10	<div><div>1</div><div>2</div><div>3</div><div>1R1 1C1 1V1 1R7 1C3 1R2 1R6 1V4 1R3 1C2 1V2 1R7 1C4 1R4 1R5 1C5</div><div>2≡1</div><div>3≡1</div></div>	<div><div>1</div><div>2</div><div>3</div><div>1R1 1C1 1V1 1R7 1C3 1R2 1R6 1V4 1R3 1C2 1V2 1R7 1C4 1R4 1R5 1C5</div></div>	When there is a group of identical components on an assembly drawing, only one group need be depicted, with appropriate indication of the rest.
11	<div><div>1</div><div>2</div><div>3</div><div>1R1 1C1 1V1 1R7 1C3 1R2 1R6 1V4 1R3 1C2 1V2 1R7 1C4 1R4 1R5 1C5</div><div>2≡1</div><div>3≡1</div></div>	<div><div>1</div><div>2</div><div>3</div><div>1R1 1C1 1V1 1R7 1C3 1R2 1R6 1V4 1R3 1C2 1V2 1R7 1C4 1R4 1R5 1C5</div></div>	Where the features of a part are represented in full on one view, they may be depicted in simplified form on related views.

Example No.	Simplified representation	Conventional representation	Description
12			The form of a pipe may be depicted with a centre line with detail at each end.
13	 	 	Where a component or components of a product are shown in complete form in one view, it is permitted to depict them in simplified form in other views.

Example No.	Simplified representation	Conventional representation	Description
14			Standard and other widely used parts may be shown in outline.
15			In an assembly drawing, chamfers, ribs, knurls, draft angles, etc., of the parts may be omitted.

